

REMARKS

Applicants respectfully request reconsideration of this application in view of the foregoing amendment and following remarks.

Status of the Claims

Claims 1-4 are pending in this application. Claim 1 is independent. All of the pending claims stand rejected. By this amendment, claims 1-4 are amended. No new matter has been added by this amendment.

Rejection under 35 U.S.C. §103 (a)

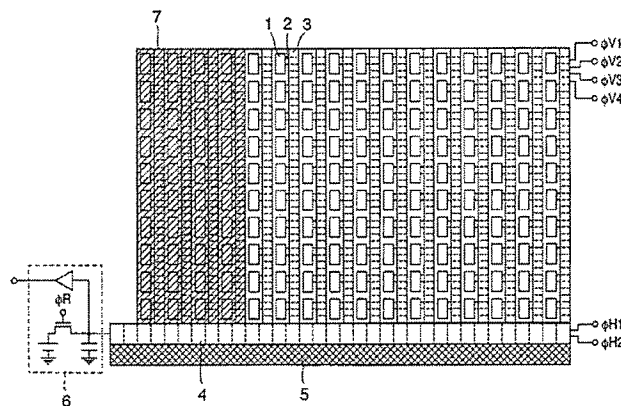
Claims 1-4 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,211,915 to Harada ("Harada") in view of U.S. Pub. No. 2002/0039144 to Yamada ("Yamada") further in view of U.S. Pub. No. 2001/0020909 to Sakuragi ("Sakuragi")

Claim 1 has been amended for further clarification. In particular, amended claim 1 recites, *inter alia*, "a driving circuit which, while signal charges are stored in the photoelectric conversion portion, stops providing the horizontal transfer pulse to the horizontal transfer portion, and drains the unnecessary charges generated at the vertical transfer portions of said image sensing element through the horizontal drain portion only if the unnecessary charges are transferred over a tolerance of the horizontal transfer portion." Support for the amendment may be found throughout the specification as originally filed including, e.g., page 7, line 26 through page 8, line 15.

Referring to Fig. 1 of the present application as shown below, one of the goals of the present invention solves the optical black (OB) malfunctions in an image sensing apparatus. Specifically, unnecessary charges generated at the vertical transfer portions 3 are drained during a storage period, i.e., an operation period during which photodiodes 1 convert the optical image

of an object into signal charges and stores the signal charges in the photodiodes. Subsequently, after the unnecessary charges are drained, the signal charges may be output to the vertical transfer portions 3 and then transferred to the horizontal transfer portion 4 to be output to the charge detection circuit 6 where the transferred signal charges are converted into an image signal (e.g., a signal voltage). The outputted image signal undergoes an optical black (OB) clamping operation using the image signal output from the horizontal optical black region 7.

FIG. 1



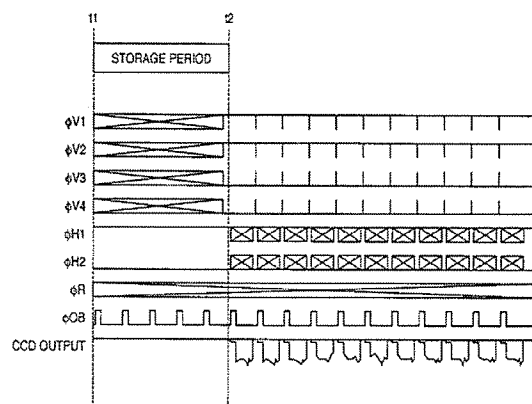
In the prior art, unnecessary charges at the vertical transfer portions 3 are drained during the storage period. As a result, since unnecessary charges are also output from the horizontal optical black region 7, the OB clamping operation, vulnerable to malfunctions, is inactivated during the storage period.

To solve this malfunction problem, the image sensing apparatus of amended claim 1 includes, *inter alia*, a horizontal drain portion 7 that drains charges overflowing from the horizontal transfer portion, i.e., the horizontal drain portion of claim 1 operates conditionally according to the status of the unnecessary charges at the horizontal transfer portion. Furthermore, the driving circuit of amended claim 1 is configured to stop operating the horizontal transfer portion, and drain the unnecessary charges at the vertical transfer portions through the horizontal

drain portion only if the unnecessary charges are transferred over a tolerance of the horizontal transfer portion during the storage period.

For example, as shown in Fig. 2 of the present application below, the horizontal transfer pulses (i.e., $\phi H1$ and $\phi H2$) are not provided to the horizontal transfer portion during the "STORAGE PERIOD". As a result, the OB clamping operation (i.e., ϕOB) can be activated during the "STORAGE PERIOD" without concern about the OB clamping malfunction.

FIG. 2



Applicant believes that none of the cited references (i.e., Harada, Yamada and Sakuragi) teaches this aspect of the present invention discussed above. For example, Harada fails to show or suggest the horizontal drain portion as required by amended claim 1. Harada further fails to show or suggest draining the unnecessary charges only if the unnecessary charges are transferred over a tolerance of the horizontal transfer portion as specifically required by amended claim 1.

Yamada discloses in, e.g., Figs. 4 and 15, a discharge drain 45 as an alternative drain channel to the horizontal charge transfer device 40. However, the discharge drain 45 of Yamada is different from the horizontal drain portion of amended claim 1 in that it discharges the noise charges exclusively regardless of the status of the horizontal charge transfer device 40. In contrast, the horizontal drain portion of amended claim 1 requires to drain only overflowing

charges that overflows the horizontal transfer portion. Moreover, Yamada further fails to teach whether the operation of the discharge drain 45 is limited during the storage period as required by amended claim 1.

Sakuragi is cited as disclosing generating a reference voltage but fails to show or suggest the inventive aspects of amended claim 1 as discussed above, e.g., a horizontal drain portion and driving circuit.

Accordingly, each of claim 1, and claims 2-4 in depending from claim 1 as amended, is believed neither anticipated by nor rendered obvious in view of the cited references (i.e., Harada, Yamada and Sakuragi), either taken alone or in combination, for at least the reasons discussed above.

Reconsideration and withdrawal of the rejection of claims 1-4 under 35 U.S.C. §103(a) is respectfully requested.

Applicant has chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art.

Applicant believes that the application as amended is in condition for allowance and such action is respectfully requested.

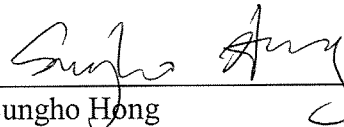
AUTHORIZATION

No petitions or additional fees are believed due for this amendment and/or any accompanying submissions. However, to the extent that any additional fees and/or petition is required, including a petition for extension of time, Applicant hereby petitions the Commissioner to grant such petition, and hereby authorizes the Commissioner to charge any additional fees, including any fees which may be required for such petition, or credit any overpayment to Deposit Account No. 13-4500 (Order No. 1232-5209). A DUPLICATE COPY OF THIS SHEET IS ENCLOSED.

An early and favorable examination on the merits is respectfully requested.

Respectfully submitted,
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Dated: October 3, 2008

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